



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,914	09/19/2003	Eugene E. Fike	CNF-007	6467

21323 7590 09/16/2004

TESTA, HURWITZ & THIBEAULT, LLP
HIGH STREET TOWER
125 HIGH STREET
BOSTON, MA 02110

EXAMINER

KALIVODA, CHRISTOPHER M

ART UNIT PAPER NUMBER

2883

DATE MAILED: 09/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/666,914

Applicant(s)

FIKE ET AL.

Examiner

Christopher M. Kalivoda

Art Unit

2883

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☒ Claim(s) 5 and 13 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/12/2004.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____

DETAILED ACTION

Claim Objections

1. Claims 5 and 13 objected to because of the following informalities: Regarding claim 5, line 1 references "the vertical taper". However, there is no reference to a "vertical taper" in claim 3 or 1 from which this claims depends.

Regarding claim 13, line 1 references "the vertical taper". However, there is no reference to a "vertical taper" in claim 11 or 9 from which this claims depends. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-15 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,838,870 to Soref. Regarding independent claims 1 and 9, Soref teaches a mode converter/method of forming a mode converter comprising a silicon waveguide core (col 3, lines 22-26 and Fig 2b) deposited over a first silicon dioxide cladding layer (col 3, lines 22-26 and 39-41 and Fig 2b), the silicon waveguide core polished such that a first end of the silicon core has a larger cross-sectional area than a second end of the silicon waveguide core (col 4, lines 38-44 and Fig 3, ref sign 14). The limitations of Soref clearly fully meet applicant's claimed limitations.

Art Unit: 2883

Regarding claims 2 - 4 and 10-12, the core has a vertical taper and lateral taper (col 4, lines 38-44 and Fig 3, ref sign 14) and the core has an angled top surface and flat bottom surface (Fig 3, ref sign 14).

Regarding claims 5 and 13, it appears from the figure the slope of the vertical taper matches the slope of the lateral taper (Fig 3).

Regarding claims 6 and 14, there is a second silicon dioxide layer cladding layer deposited over the silicon waveguide core to provide a symmetric clad (col 3, line 39-41 and Fig 2b).

Regarding claims 7 and 15, there is a silicon substrate (col 3, lines 22-26 and Fig 2b, ref sign 6) and the first silicon dioxide cladding layer and the silicon waveguide core are formed over the silicon substrate (Fig 2b, ref sign 3 and "Si").

Regarding claim 8, the second end of the silicon waveguide core has at least one dimension of about 1 micron (col 3, lines 54-60).

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-32 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Application 2003/0044118 to Zhou et al. Regarding independent claims 1 and 9,

Art Unit: 2883

Zhou et al. teach a mode converter/method of forming a mode converter comprising a silicon waveguide core (para 0258, lines 2-6 and Fig 24a, ref sign 1610 and para 0260, lines 12-16 and Fig 24e, ref sign 1650) deposited over a first silicon dioxide cladding layer (para 0258, lines 2-6 and Fig 24a, ref sign 1615), the silicon waveguide core polished such that a first end of the silicon core has a larger cross-sectional area than a second end of the silicon waveguide core (Fig 24e). The limitations of Zhou et al. clearly fully meet applicant's claimed limitations.

Regarding independent claims 18 and 25, Zhou et al. teach a mode converter/method of forming a mode converter comprising a silicon waveguide core (para 0258, lines 2-6 and Fig 24a, ref sign 1610 and para 0260, lines 12-16 and Fig 24e, ref sign 1650) deposited over a first silicon dioxide cladding layer (para 0258, lines 2-6 and Fig 24a, ref sign 1615), the silicon core being tapered using a gray-scale lithographic mask (para 0259, lines 4-6 and para 0260, lines 12-16) such that a first end of the silicon waveguide core has a large cross sectional area than a second end of the silicon waveguide core (Fig 24e). The limitations of Zhou et al. clearly fully meet applicant's claimed limitations.

Regarding claims 2 – 4, 10-12, 19, 20, 26 and 27 the core has a vertical taper and lateral taper (para 0260, lines 12-16 and Fig 24e and 24f) formed by using a lithographic mask and etch process (para 0259, lines 4-6 and para 0260, lines 1-3) and the core has an angled top surface and flat bottom surface (Fig 24e).

Art Unit: 2883

Regarding claims 5, 13, 21 and 28, it appears from the figure the slope of the vertical taper matches the slope of the lateral taper (Fig 24e and Fig 24f).

Regarding claims 6, 14, 22 and 22, there is a second silicon dioxide layer cladding layer deposited over the silicon waveguide core to provide a symmetric clad (para 0261, lines 5-8).

Regarding claims 7, 15, 23 and 30, there is a silicon substrate (para 0258, lines 6-10 and Fig 24a, ref sign 1620) and the first silicon dioxide cladding layer and the silicon waveguide core are formed over the silicon substrate (Fig 24a, ref sign 1601, 1615 and 1620).

Regarding claims 8 and 24, the second end of the silicon waveguide core has at least one dimension of about 1 micron or about 0.25 microns (para 0260, lines 19-21 and para 0262, lines 5-8).

Regarding claims 16, 17, 31 and 32, one end is mode matched to a single mode fiber and one end is matched to a semiconductor laser (para 0025, lines 5-12 and Fig 6).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 6,571,039 to Al-Hemyari describes a mode converter with a doped silica core and cladding on top a substrate. The device is fabricated using a gray-scale lithographic process and has both vertical and lateral tapers.

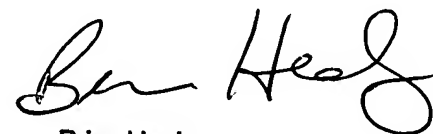
Art Unit: 2883

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Kalivoda whose telephone number is (571) 272-2476. The examiner can normally be reached on Monday - Friday (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

8. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


cmk


Brian Healy
Primary Examiner